The JOURNAL of GEOGRAPHY

A MAGAZINE FOR TEACHERS

VOLUME XXI NUMBER 2

FEBRUARY, 1922

IN THIS ISSUE

ENVIRONMENT IN THE HISTORY OF AMERICAN AGRICULTURE
ALBERT P. BRIGHAM

SIGNIFICANT GEOGRAPHIC PROBLEMS OF THE OUTWASH PLAINS OF SOUTHWESTERN MICHIGAN
D. H. DAVIS

THE PROPOSED GREAT LAKES—ST. LAWRENCE DEEP WATERWAY
FLORENCE WHITBECK

THE TEACHING OF DIRECTIONS IN SPACE AND ON MAPS
DOUGLAS C. RIDGLEY

THE KIND OF GEOGRAPHY THE WORKING WORLD NEEDS
E. E. HOLMES

THE JOURNAL OF GEOGRAPHY

A MAGAZINE FOR TEACHERS

Editor

GEORGE J. MILLER

State Teachers College, Mankato, Minn.

Associate Editors

R. H. Whitbeck, University of Wisconsin, Madison

Erna Grassmuck, State Department of Public Instruction, Harrisburg, Pennsylvania

R. M. Brown, Rhode Island College of Education, Providence

A. E. Parkins, George Peabody College for Teachers, Nashville, Tennessee

Business Manager

2249 Calumet Ave., Chicago, Ill.

SUBSCRIPTION TERMS

The *Journal of Geography* is published monthly except June, July, and August.

The subscription price is $2.00 a year, payable in advance; the price of single copies is 25 cents. Orders for less than a half year will be charged at single-copy rate.

Postage is prepaid by the publishers on all orders from the United States, Mexico, Cuba, Porto Rico, Panama Canal Zone, Republic of Panama, Hawaiian Islands, Philippine Islands, Guam, Samoan Islands, Shanghai.

Postage is charged extra as follows: For Canada, 30 cents on annual subscriptions (total $2.30), on single copies 3 cents (total 28 cents); for all other countries in the Postal Union, 52 cents on annual subscriptions (total $2.52), on single copies 6 cents (total 31 cents).

The *Journal* is the official organ of the National Council of Geography Teachers and is sent to all members of the organization. The annual dues, $1.50, are payable to the *Business Manager*. Extra postage rates for copies sent to foreign countries should be added to the membership dues.

Patrons are requested to make all remittances payable to the *Business Manager*, in postal or express money orders or bank drafts.

It is assumed that members and subscribers wish to continue receiving the *Journal*. However, remittances must be sent promptly to assure your volume being complete.

Send manuscript and books for notice or review to the editor.

Send orders for back numbers to May, 1920 inclusive to the editor.

Published monthly except June, July, and August

PUBLICATION OFFICES: 450 AHNAIP STREET, MENASHA, WISCONSIN

All Business Correspondence, Membership Dues, and Subscriptions should be sent to the

BUSINESS OFFICE, 2249 CALUMET AVENUE, CHICAGO

A. J. NYSTROM AND COMPANY, PUBLISHERS

Entered as second-class matter January 15, 1919, at the postoffice at Menasha, Wisconsin, under the Act of March 3, 1879.

The JOURNAL of GEOGRAPHY

VOLUME XXI FEBRUARY, 1922 NUMBER 2

ENVIRONMENT IN THE HISTORY OF AMERICAN AGRICULTURE*

ALBERT PERRY BRIGHAM
Colgate University, Hamilton, N. Y.

For purposes of advanced study we may divide the United States into four parts, the East, the South, the North Central or Mid-Continental and the West.

The East as we are now taking it, is really the northeast, including the New England and Middle Atlantic state groups of the Census. It is a region of mountains and dissected plateaus, with a broken shoreline and without much coastal or lake plain, embracing both the oceanic and the continental type of climate. Its unity is largely historical and industrial, being the area of densest population, high urban percentages, the center of New-World manufactures and for America old.

The South reaches from Delaware and Maryland to Texas, a plain crowded by a wedge of Appalachian highland, old in the Atlantic and lower Mississippi, young in Texas and Oklahoma, a region of subtropical heat, and sparse population, being agricultural, and non-industrial, a conservative society awakening to new interests.

The North Central or Mid-Continental region is mostly plain with a continental climate. It is historically youthful, a child of the East, mainly agricultural but showing great local unfoldings of industry. Let us drop the words Middle West, a symptom of the westward movement which now has only the meaning of a fossil.

The real and only West in our time is almost literally the western half of our domain from central Kansas onward, graduating from Mid-Continental and South by the vague climatic and vegetation boundary that we associate with the one hundredth meridian. Here are plateaus and mountains, and the intermontane valleys of the coastal states. The climate is oceanic on the border, and desert in the interior save at higher altitudes. It is historically adolescent, non-industrial, scattering in population, and having an agriculture of special types.

* Read before the New England History Teachers' Association, at Clark University, March 19, 1921.

Already we get glimpses of the pervasive principle that physical and human conditions are inextricably tangled in the skein. The suspicion dawns on us that physical features are a part, but not the whole of environment. What would the panorama of America, the cross section of the continent be today, if America had been settled from the West and not from the East? I do not mean by Japanese or Chinese, but, if it were conceivable, by European stocks coming to the continent across the Pacific Ocean. We cannot construct imaginary history, but if we could we might be better able than we are to evaluate geographic influences. Some of our conclusions might be upset, and we might become cautious in entering that great field where heredity, race and tradition meet the factors of present environment.

Looking at our four sections as farming regions, the East is a place of diversified farming, with grass and other forage in the ascendant. The South is a one-crop country with growing specialties. The Mid-Continental country is a zone of cereals and livestock, while the West is the place of irrigation and dry farming, with local rainfall adequate in spots, and a great variety of crops.

In all of the four regions are local variations and intensive cultures, growing out of adjustments both to natural and social features of environment. A short list of some of these specialties will be useful just here. Among them are market-garden areas, dairy regions, fruit districts, and sections given to tobacco, flax fibre, cane sugar, hops, or special cereals such as spring wheat, buckwheat, rice and dry corn.

Specialization and intensification have not gone far enough to rule out the phrase "cheap-land farming" as applied to American agriculture as a whole. This is the most conspicuous fact in the history of American farming, and has been true of our country thruout the westward movement. With the exhaustion of free land, within the memory of some of us, intensive agriculture has been encouraged, but vast areas of cheap land still remain. Cheap-land farming is not as sometimes thought, reprehensible, it has been an imperative part of the program of youthful America. Our goal could not be the largest yield per acre, but the largest product per man. Labor has always been and still is nearer the center of our problem than land.

With this outlook of a general sort, we may state certain conditions or factors that influence the distribution of crops. Our question in this paper is,—how far are these influences physical and to what degree may they be historical, social, and industrial? We cannot, nor indeed can any one answer this query precisely or quantitatively, but we shall gain much if we learn that a thing apparently so simple

as where we raise corn, wheat, sugar beets, or dairy cows, may hinge on a complex of conditions, that this complex is shifting, and that environment is only partly in control, unless indeed, we include in that term the facts of human development and human needs.

Climate, especially the elements of rainfall and temperature, are more pervasive and powerful than the land forms, and perhaps more controlling than the soils. Thus temperature is the main difference between the South and the Mid-Continental states. The essential thing in the southland is a period of at least seven months which is frost-free. The surfaces in both regions are typically lowland plains, well watered. Glacial and lake plains predominate in the northern area and most of the South has coastal and alluvial lowlands. This distinction, however, is not of critical importance; it is the condition of temperature that puts cotton in Alabama and wheat in the Red River Valley.

Within the cotton belt differences of soil cause differences in acreage and yield, but, and here I am quoting authority, "the outer boundaries of cotton production are determined almost entirely by climatic factors." Even here let us stop to observe that the language quoted does not tell the whole story of the northern boundary of cotton. During the chaos of the Civil War, some cotton was raised in southern Illinois. Here was a historical factor overruling in a small measure climatic control. At the present time, far more cotton might be raised in Kentucky and North Carolina, and would be there raised, but for the greater profit of raising tobacco in those states. Here comes in an economic factor to minimize a physical element in the problem.

Looking at cotton again; this fiber, powerful as it is in making the South a one-crop region, is not so merely because the South has a summer long enough and hot enough to raise it,—there is a social-economic reason for its dominance. The exposition of this social reason is one of the features, if I mistake not, of the new interest in the history of the South, shown by our historical scholars in recent years. It has to do with the Negro and the plantation and the personality of the plantation owner and it has been modified but not removed by the freedom of the black man, and by the tendency toward diversity and local adjustment in southern farming.

Moreover there is a powerful commercial reason for one crop in the South. It needs but to be named, the steady, world market—for a sure money crop, embracing about two thirds of the world's commercial cotton. The wheat market of Europe may be satiated by the Argentine, by Australia, in normal times by Russia, in the days of

the World War, by ourselves, giving up some of our wheaten supply; but in spite of British, German, French and Russian efforts to produce colonial cotton, the unhindered voyage of the southern cotton bale proceeds, to Liverpool, to Havre, to Genoa, to every center of cotton spindles in Europe. The exports of cotton in 1920 amounted to $1,381,000,000.

What then has taken this fiber, and in a little more than a century made southern cotton outrun the linen and woolen, of the world? The reasons for what we see are several—and they include at least these—temperature, the invention of the cotton gin, the Negro worker, the planter aristocrat, and the world market.

If we compare the East and the Mid-Continental regions on the one hand, with the West on the other, the principal difference, from the agricultural point of view, is the amount of rainfall. Here we are considering the West as a whole, and must take account of local differences in that vast area. Thus the extreme Northwest is wetter than the East, while the far Southwest is very dry and much of it very hot.

It will be of some interest to compare the land forms, climatic features and crops of New York with those of the State of Washington. New York has alluvial valley floors, lake plains, with plateau and mountain areas of high geological antiquity. Washington has the intermontane lowlands of the Puget Sound Valley, lava plateaus and mountain belts, younger in the main than corresponding features of New York. The Empire State has large rainfall on the seaboard, dropping to moderate precipitation in the Niagara region. Washington has the largest rainfall of the United States on the Pacific border, dropping to semi-arid conditions behind the Cascade Range. Thus the range of rainfall is greater and the seasonal range of temperature is smaller than in New York.

Turning to the crops, New York has general farming, with cereals, forage, pasture and livestock, apples and hops, Washington also has all of these with some differences. Its wheat is in part raised by methods of dry farming, its apples by irrigation, and its livestock leans more to beef and less to dairy. New York, by reason of greater age and large urban groups, has more specialties of tillage, as in garden vegetables, grapes, onions, and dry beans.

Summing up the comparison, natural conditions show general resemblances, with differences of detail, and the same is true of the crops. New York on account of its age and population shows more special and intensive culture, but modern invention tends toward swift adjust-

ment in the more youthful state. The glacial soils of western New York are as well adapted to wheat as the residual lava soils of eastern Washington, and the plains of the Genesee country are in themselves as well suited to big machines as the bonanza farms of the Columbia basin: but social, historical and economic conditions have cut western New York into small fields, and made its land too valuable for its bread-raising specialty of seventy-five years ago.

Here is well illustrated a statement which we quote from Bailey's Cyclopedia of American Agriculture,—"All intensive and special types are likely to develop in any region as they are controlled less by material factors than by economic and personal ones." A good example of this principle is seen in the strawberry, which thrives in all American latitudes, which to a certain extent is favored by special soils, but in general is grown where it is needed, and it should be added, when it is wanted, being grown in southern lowlands to meet early markets in northern cities.

Falmouth on Cape Cod is a strawberry center, the soil is good and the climate is good, but we must not forget that the Portuguese are born fruit raisers, willing to clean up oak scrub, for the lure of the Boston market. With a certain amount of natural adjustment, it is after all a market demand, an economic factor that has put strawberries on the lake plains of New York, the coastal plains from New Jersey to Florida, in the Appalachian Valley of Tennesee, on the alluvial lands of southern Illinois, in the maturing plateaus of the western Ozarks and in the Willamette Valley of Oregon.

Thus we may say that the entire outfit of natural, including climatic factors, conditions of population and market demand, with developed transportation, devices for preserving, hereditary and personal aptitudes and the historical maturity or youth of a region, all go to determine the detailed and special distribution of crop production.

Having endeavored to state and in some degree to illustrate the principle of a composite control by natural and human factors of environment, working in ever shifting combinations, with results that sometimes bring about natural adjustments and sometimes work away from them, we may now look more closely at certain specific crops, as regions have grown historically older and as the pioneer zone has moved westward.

New England has changed from general to special and limited farming. In the early days it must raise all the food and fiber it needed, save for a few luxuries, or certain necessities, few also, which it could not manufacture. For long now the larger general supplies have been

to advantage raised far away and shipped to New England consumers. The industrial population has outrun the capacity of the home farms which are needed for bulky and perishable products raised near home markets.

There is no natural reason why corn may not be raised on Cape Cod and tall corn can be seen today in the gardens of Barnstable County. It was raised there and was exported largely, for the days of small things. This has passed now because the large-scale production of the corn belt and the modern railway have made it economical to buy the corn for the pantry and the poultry yard. Cranberries, however, stick to Plymouth County and the Cape because they are closely adjusted to the natural environment. Gardening develops around Boston or Providence and the milk trains reach far out into New England because of the market demands. Tobacco and onions in the Connecticut Valley and potatoes in the Aroostook country are also examples of the modern intensive stage.

New York has had a similar development and few details need be given. Its capacity for wheat has been noted, and the state raised 11,000,000 bushels in 1919, but the population requires more than 60,000,000 bushels. New York farms are serving the cities of the Empire State and in special areas are raising congenial crops, such as onions, grapes, apples, hops, buckwheat and dry beans. Its controlling industry is the dairy. Here the natural and the economic factors pull together, as they do in New England. Cool, thin-soiled uplands favor grass and permit of corn raised to the silo stage, and it is therefore no undue strain on natural conditions that the millions on and around Manhattan Island daily reach out across hundreds of miles to the St. Lawrence and the Genesee.

Wisconsin is old enough to have passed to a degree thru the cheap-land stage to harmony with physical and human environment. In Dane County, in which is Madison, the capitol, wheat was the staple and the money crop down to about 1870. Corn could be raised but could not be taken to market. It was supposed that grass and clover would not flourish. Capital was needed for stock and the winters were thought too long and severe for profit in this industry. Hence the farmer stuck to wheat, in spite of soil impoverishment, winter killing and poor marketing. The county raised 3,000,000 bushels in 1860 and less than 80,000 in 1900.

This period marked the change to diversified farming. Vermonters and Ohioans came in with sheep. Ohio men had learned the culture of tobacco at home and brought it with them. During the war sorghum

and honey were tried in lieu of sugar. The farmers experimented with hemp and flax and failed. They bought more farm animals and raised more corn and oats and less wheat. Hops came in with farmers from central New York, had a short run and went out. Tobacco remains, an important crop. There was vast growth of the dairy after the Civil War when a pound of butter was sometimes worth more in Madison than a bushel of wheat. Here is another example of social influence,—Swiss immigrants moved in and began to make cheese. Wheat dropped to one fortieth in forty years and the dairy increased five fold. Today Wisconsin stands for dairy, tobacco, potatoes and truck, with general farming. Here are ignorance, lack of transportation, intelligence enlarged by testing, and farm knowledge diffused by one of the most efficient of State Universities, the building of roads and the growth of cities,—all these forces have cooperated to bring a great commonwealth whose statehood and first railroad are so recent as the middle of the last century, into fairly close adjustment to nature and to man.

In 1850 the center of American wheat production was in Ohio, in 1860 in Indiana, in 1870 and 1880 in Illinois and in 1890 in Missouri. In 1900 it had taken a sharp leap to the northwest and rested west of Des Moines, within seventy miles of the Missouri River. In another ten years it was still farther northwest in eastern Nebraska.

There is no time to fill in the outline. Wheat has followed the migration of the frontier. This was partly because the western lands were suited to large-scale production, with small man power and much use of machinery. In 1830 it took 160 hours of labor to produce fifty bushels of wheat. From 1865 to 1896 but 7.43 hours were required. Historical and economic reasons have played large in the migration of wheat. Settlement began in the East and notwithstanding the drainage of population westward, the East has come to high densities and great urban centering of population. Thus vast industrial groups have formed and the demand for bulky and perishable products of the soil has made the land too costly for the raising of wheat. Wheat has built the western railroads, wheat can stand the transportation, and can be brought not only across a continent but from the antipodes.

Let us not omit another human factor in this march to the northwest, the invention of a cleansing process that made spring wheat desirable and sent production to Minnesota, Dakota and the plains of Western Canada.

Wheat can be raised and is raised about as much in the East as formerly, absolutely—of course not relatively. When the West is

as full of people and big cities as the East what will happen to wheat? We may import it from Canada. But when Canada is closely peopled, what then? We must fall back on more intensive cultivation, becoming like France and the eastern parts of England, which after centuries of tillage produce twenty and thirty bushels per acre. Then the soil exhaustion and the straw burning that have gone along with wheat will be checked by better farming methods, serving a population increasing slowly or static in numbers, as in France.

The greatest unfolding in American agriculture is in the West. Here aridity is the rule, adequate rainfall the exception. Here therefore tillage is special, and in modes definitely responsive to physical conditions. The less important but by no means negligible method is by what is known as dry farming, which, in a word, means that the farmer, by cultivation, by selection of varieties and by breeding varieties, makes the most of small rainfall.

The major method is irrigation, applied by the Mormon community about 1850, by the Greeley colony in 1870, by hosts of individuals and corporations after that time and by the Federal Reclamation Service since the present century came in. This method means that waters from the mountains and in less measure from the ground, are spread over lands which otherwise raise only the sparse vegetation of the desert.

The result of irrigation activities is the intensive cultivation of limited areas and the production of a large variety of special crops, of which several have been taken over from the Eastern Hemisphere. It means also from the social point of view, close community life for farmers, high standards of living, public utilities for rural population, social development in schools, churches, clubs and associations of every kind. It means in concentrated areas, rapid growth, creation of large property values, with returns in taxes, foods and fibers, to government and to the people of the nation. It means the application and the development of keen intelligence, under the bright skies and in the sharp air of the desert.

In deserts where only sage brush grew and the coyote howled, in a part of the basin of the Snake River, in the time that it takes a baby to reach the fourth grade, ten thousand people had come, stacks of hay and grain arose, there were herds and flocks, fifteen hundred farm homes, and highly organized schools whence every afternoon a thousand children rushed for the school wagons that would bear them to their country homes. This school included household arts, manual

training, agriculture and a practice dairy, all perfectly ventilated and heated by electricity. This is one sample.

Few of the western states, that is, states beyond the one hundredth meridian, would be more than territorial annexes to the federal group today but for this mode of culture. Save for small beginnings this enrichment of western life has come about in half a hundred years. If it be desirable for a nation to be self sustaining, the new varieties of crops in this great western region will take us far toward the goal.

It is time to make a brief summary. Since the days of Plymouth and Jamestown, a human stream has flowed over a reserved continent and for a hundred years it has been a flood. Mixed crops belong to the pioneer, or cheap-land stage in a new country, prior to effective means of transportation. Hence the natural features have a large but not a maximum influence, climatic features dominating those of a physiographic nature. This last is true of crop growth in all stages of development, not denying the large functions of soil, slope and exposure. All conditions save fundamental climatic differences are overruled by the isolation and the comprehensive needs of the pioneer.

In the advanced stage of dense population, of mechanical appliances and of modern knowledge of farming methods, specialized agriculture prevails, and is largely the result of close adjustment to natural environment. But this perfection of adjustment is modified by economic conditions, such as great urban markets, crop failures in other states or on other continents, thru bad seasons, pests, plant diseases, or war. Whether it wills it or not, the human world is now, thru invention, in some sense one, and economic needs may at any time put stress on ideal adjustments to nature.

American agriculture in its swift conquest of a vast domain is unique in the history of the world. Europe was slowly subdued during three millenniums, by civilized men. America was suddenly found as an empty continent, providing a ready overflow for crowded Europe. The great onrush has been during a hundred years of invention. The only comparable countries are southern Canada, Argentina and Australia. Of the latter two, Argentina is smaller than the United States and Australia is by nature behind us in possibilities. Both are in the Southern Hemisphere, away from the vast, progressive populations of the North Temperate Zone. The American achievement is and seems likely to remain without a parallel.

SIGNIFICANT GEOGRAPHIC PROBLEMS OF THE OUTWASH PLAINS OF SOUTHWESTERN MICHIGAN

D. H. DAVIS
Department of Geography, University of Michigan

ORIGIN OF TOPOGRAPHIC FORMS AND SOILS

During the recession of the Wisconsin Ice Sheet, the water from the ice lobes to the west, north and east flowed off to the southwest, burying the counties of southwestern Michigan beneath a mantle of outwash. By the time the ice had retreated to the Kalamazoo-Mississinawa Morainic System, the earlier moraines farther south had been badly broken by lines of glacial drainage, the gravel plains of the St. Joseph passing thru the Sturgis moraine in a gap five to six miles wide.

FIGURE 1. Sturgis moraine in the background with the gravel plains of the St. Joseph in the foreground

With this history, the soils of Southwestern Michigan must of necessity be largely sand and gravel. Cass County contains no clayey till, St. Joseph County less than two per cent while Kalamazoo and Calhoun Counties each contain about 8.6 per cent.

County	Area in sections	Swamp and lake	Clayey till	Sandy till	Sandy	Gravelly loam
Cass	513.5	59		179.0	90.5	185
St. Joseph	518.5	54	10	99.0	267.5	88
Calhoun	720.0	62	57	302.5	98.5	200
Kalamazoo	576.0	50	66	78.0	65.0	317

Interspersed in the outwash, are numerous small prairies, grassy tracts with gently sloping surface and fertile soil. The prairies were

treeless; the outwash plains were covered with open stands of oak timber; it was only on the heavier clay soil of small sections that the timber was dense. It was this combination of topography, soil and vegetation which rendered the area so available for early settlement and so attractive to the pioneer.

EARLY SETTLEMENTS AND ADJUSTMENTS

Outside of the area of French settlement around Detroit, the first portion of the southern peninsula to be occupied by actual settlers was the outwash plains of southwestern Michigan. The first settlers came from the south, moving in from the older Indiana settlements. At a somewhat later date, two roads, both following important Indian trails were important, the Chicago Road which ran west from Detroit

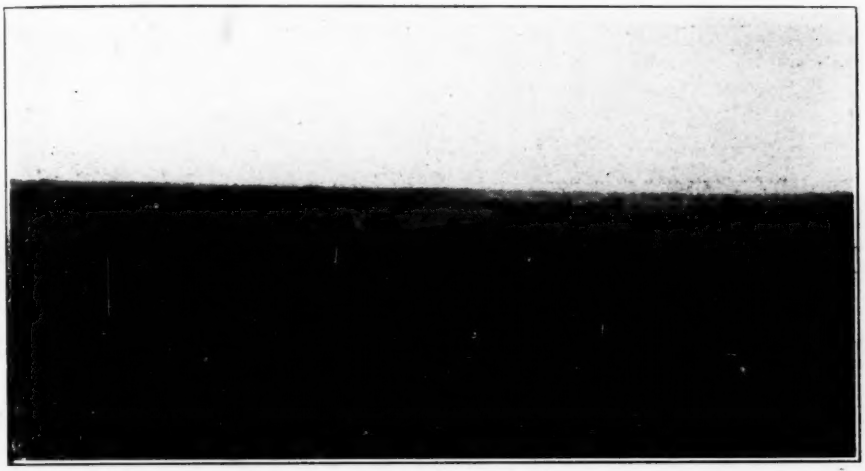

FIGURE 2. View across the outwash plains to the east of the Sturgis moraine

thru Ypsilanti, Saline, Clinton, Jonesville, Coldwater, White Pigeon, Mottville, Edwardsburg and Niles to Chicago and the Territorial Road which passed thru Ann Arbor, Jackson, Marshall, Battle Creek and Kalamazoo.

The early village settlements were of two classes: (1) "Rural Towns" on the edges of prairies and (2) "Mill Towns" at power sites which were quite frequently on the principal highways. To the first class, belong such settlements as Centerville on the Nottawa Sepe Prairie, White Pigeon on the Pigeon Prairie, Edwardsburg on Beardsley's Prairie and Schoolcraft on Prairie Ronde. To the second class, belong such settlements as Battle Creek and Kalamazoo on the Kalamazoo River, Jackson on the Grand River and Three Rivers where the Rocky and Portage join the St. Joseph River.

In the period of early settlement, the rural town justified its existence, representing one phase of the adjustment to the then existing conditions. Railroads were unknown, roads were poor and in sections impassable much of the year. The economic life of the farming community found its center in the village. Each settlement was in large measure self sufficient. The village mill supplied flour and feed; saw mills produced the necessary lumber. Fortunately, tastes were simple and wants were few as communication with the outside world was difficult, often almost impossible and always expensive.

"The mill towns," located largely or wholly on account of power opportunities, were in general possessed of better strategic positions than the prairie towns. Power locations were often combined with a site which represented a convergence of Indian trails, which following

FIGURE 3. A farm devoted to the raising of melons

as they did, the lines of easiest access to the most desirable portions of the adjacent areas, determined the location of the main wagon roads and the later railroads.

The location of the early towns was an adjustment to the pioneer condition, the relative importance of the various villages being based, not on their relation to large areas and lines of communication which are today important, but on the ability to serve a limited area satisfactorily under existing conditions. By the time of the coming of the railroad, the outwash plains were settled and this early adjustment of small town and farm population had been largely perfected.

During the period of settlement, the growth of population was remarkable. Between 1835 and 1860, the rural population of Kalamazoo County increased from practically nothing to 18,701; in Calhoun County, the rural population grew to over 20,000 during the same period, while Cass and St. Joseph Counties contained 16,540 and 17,030 people respectively on the farms and in purely rural communities by the close of the period.

DECLINE OF RURAL COMMUNITIES AND INDUSTRIALIZATION OF CITIES

Since the initial period of rapid settlement and development, virtually all of which occurred in twenty years, a gradual and steady decline has occurred in the population of the rural districts. The total population of the counties has increased, but the farms have lost and are today losing in population. This is occurring in many places but to an especially alarming extent in this particular section.

FIGURE 4. The gravelly moraine furnishes advantageous sites for orchards and supplies road ballast for the sandy outwash plains

The group of counties in the outwash plain (Cass, Calhoun, Kalamazoo and St. Joseph) had less than seventy-five per cent as many people on the farms in 1910 as in 1860. Today, after the exodus of the past ten years, the percentage is even smaller.

The attraction of this area to the early settlers was the light, easily cleared, well drained and easily tilled soil which allowed a crop to be planted the first year. The settlers were remote from markets; every man of necessity raised a great variety of crops. It was an ideal locality for the pioneer. Today, conditions are different but farm

practice has not altered materially tho better transportation facilities bring in the products of other areas.

The light soil is becoming exhausted; its humus content has been largely dissipated so that yields are poor and in a region of good rainfall dry spells work serious hardship. The returns from agriculture as practiced are no longer attractive and the young men leave the farm. The dwindling district school tells its own story. The betterment of farm machinery has been of secondary importance as a factor in the depopulation of the farms.

With the decrease of the farm population, has gone the decay of the rural village, the need for which has disappeared. The original lack of easy communication which necessitated the local centers has been remedied. Railroads and particularly improved roads and the cheap automobile have allowed the larger towns to draw more and more upon the territory of the smaller places. It is only a question of a relatively short time before the rural towns, without special advantages as to location, will be of even less relative importance than at present. Most of these places have already witnessed the transition from a position of importance to present unimportance.

While the rural population has decreased, the total population of the counties has increased as follows: Cass sixteen per cent, St. Joseph fifty per cent, Calhoun 110 per cent, Kalamazoo 150 per cent, the percentage of increase being determined by the amount of industrialization which has occurred in a given county.

The area is crossed in an east and west direction by several trunk lines: the Michigan Central runs thru the northern portion of the area; to the south, is the Lake Shore; while between these two, we have the Grand Trunk and the Air Line division of the Michigan Central also crossing in an east and west direction. Other lines cross in a north and south direction so that very little of the territory is more than four miles from a railroad. The east and west lines are all portions of thru lines of transportation and the towns located favorably with reference to them have grown remarkably. As examples, we may cite Kalamazoo and Battle Creek, whose populations have expanded as follows:

	1920	1910	1900	1890	1880	1870
Kalamazoo	48,858	39,437	24,853	17,853	11,937	9,181
Battle Creek	36,164	25,267	18,563	13,197	7,063	5,838

The growth of these two cities in Kalamazoo and Calhoun counties has been more than sufficient to offset the loss on the farms of these counties.

We have from 1860 up to the present a period of transition no adjustment having been reached as yet but with the following tendencies manifesting themselves: (1) a depopulation of the farms, (2) a condition of stagnation or depopulation of the rural villages, (3) a rapid industrial growth in the case of the cities which are favorably located with reference to main lines of transportation, the "mill towns." The question arises as to what these tendencies will lead and how the growth should be directed so as to be of most benefit.

FUTURE OF THE AREA AND THE FIELD FOR GEOGRAPHY

The initial step for each city so located that industrialization is its manifest future is to have a survey made of its possibilities so that its superiorities as to location or other natural advantages for special

FIGURE 5. Picking strawberries in September. Overhead irrigation is used, the water being obtained from Portage Creek.

types of industry can be clearly demonstrated. Each place should endeavor to attract only those types of industry to which its peculiar possibilities fit it. To do otherwise is to build on an unstable foundation. In addition to canvassing the manufacturing possibilities, the local markets should be determined and marked out so that the endeavors of its local merchants can be focused upon profitable territory.

With the industrialization of the area, the farms will be repopulated and the necessary changes will occur in the character of the crops and in farm practice. As evidence of the trend in this direction, we have several profitable melon farms whose products command a premium in city markets. In the gravelly moraines, a few commercial

orchards are making a pronounced success. In the heart of the outwash, we have the largest farm in the world for the propagation of strawberry plants.

In early days, this was a country of rare attraction to the pioneer. The country is today just as attractive in appearance. Many lakes dot the plains or stand in the basins of the moraines. Groves of oak break the monotony of the gently rolling outwash and mantle the steeper slopes. With industrialization of the larger towns, which will afford markets, specialized agriculture will be the solution of the present condition of stagnation and depopulation of this naturally attractive area.

This brief survey shows a period of cheap and easily cleared land with accompanying rapid settlement and a satisfactory adjustment

FIGURE 6. One of the numerous lakes which furnish recreation grounds for the industrial centers

to existing conditions. This is followed by a period of stagnation and rapid depopulation of the farms and small villages accompanied by industrialization of the strategically located towns. At present, the area has not reached a stable condition; change is still occurring. Analysis of the various environmental factors, both physical and economic, and evaluation of their relative importance in determining the future of the area is necessary. Adjustment will in time occur but it should not be allowed to be undirected. The poor utilization of the possibilities of this area works a hardship on the entire state. One of the great possibilities for the future of geography lies in an

intensive study of small areas such as this, for it is only by such studies that geographers will be able to intelligently interpret and thereby aid in hastening and directing adjustments in areas where the maximum use is not made of the possibilities which the area affords under existing conditions.

THE PROPOSED GREAT LAKES–ST. LAWRENCE DEEP WATERWAY*

FLORENCE WHITBECK
Madison, Wisconsin

THE PRESENT WATERWAY

During the last few years there has been an active movement for the enlargement of the St. Lawrence Waterway so as to accommodate larger ocean vessels than can now use it. An International Joint Commission was appointed by the Canadian and United States Governments to investigate the cost and practicability of such a waterway, and its report is already due. It is not yet known whether this report will be favorable or unfavorable.

At present the Great Lakes-St. Lawrence route is open thru its complete length for boats of fourteen feet draft. The St. Lawrence canals and Welland Canal are navigable for 14-foot boats; the St. Claire flats and the Detroit River have been dredged to a depth of 21 feet; at the Soo the locks have been enlarged to a depth of 24½ feet, and the Canadian Government is now enlarging the Welland Canal to a depth of 25 feet. Thus, there remains the further improvement of 46 miles of the St. Lawrence between Kingston and Montreal in order to open the Great Lakes to the sea for large ocean vessels. At present these rapids are passed by means of six side canals ranging in length from 1¼ to 14 miles. Over one-third of the registered ocean-going vessels of the United States have a draft of 14 feet or less and can, if they wish, use the present Great Lakes-St. Lawrence waterway. With the proposed enlargement, the waterway would be open to 80 per cent of our ocean-going vessels. It will be recalled that on a number of occasions vessels have already carried cargoes from the Great Lakes directly to Europe, but the practice did not prove profitable.

UNITED STATES' EXPERIENCE WITH WATERWAYS

Before embarking upon another expensive waterway project, it may be well to look into the history of the waterways of the United

* Abridged from a thesis submitted for the degree of Master of Arts at the University of Wisconsin, June, 1921.

States for the last fifty years. The United States Government has expended around $100,000,000 on the Mississippi, and aside from the traffic now carried at a loss by government barges,[1] river boats have all but disappeared from this great waterway. The government is bringing to a close a hundred-million dollar experiment on the Ohio River, with very discouraging prospects. New York State has expended about $140,000,000 on a barge canal which is doing only a fraction of the business that its advocates predicted. After years of agitation the United States Government was persuaded to build the Hennepin Canal in Illinois. The same extravagant predictions which always attend campaigns for the expenditure of public money for waterways were made regarding the service that this canal would perform, but none of the predictions have materialized and the canal has scarcely any use. In every instance, the advocates of these great public expenditures convinced themselves and others that the waterway would give cheaper transportation, and perform great public service. With the sole exception of the Great Lakes, the traffic on all of our inland waters has diminished to a mere fraction of its former volume, and this in spite of enormous expenditures of public money. Moreover, with the exception of the traffic in three commodities, the freight carried on the Great Lakes is small in amount and is declining. Those three commodities are iron ore, coal, and grain, all bulk commodities carried in cargo lots for long distances and loaded and unloaded by specially designed and highly efficient machinery. Iron ore and coal form 95 per cent of the Great Lakes traffic. These bulk commodities are shipped by water because the service by water for such traffic is superior to the service by rail, and the rates are exceedingly low. But the rates on miscellaneous freight are not enough lower than rail rates to attract any large amount of business.

REASONS ADVANCED FOR THE ST. LAWRENCE DEEP WATERWAY

The Great Lakes-St. Lawrence Tide Water Association has published much material designed to establish the desirability of the deep waterway, and from these publications many of the arguments favoring the project have been taken. The most important reasons given are as follows:

1. Opening up the St. Lawrence route will enable the West to take full advantage of its natural resources.

[1] The reports occasionally published stating that the Mississippi-Warrior service is showing a profit are incorrect. Such reports take no account of the millions of dollars of government money invested in the barges and towboats, and in the improvement and maintenance of the waterway.

2. It will offer unlimited carrying capacity to move the crops when the rush comes; it will thus relieve the eastern roads of congestion during crop movement and will save them the expense of providing for the peak load.

3. It will make the states bordering the lakes a part of the Atlantic seaboard; it will bring the prairie states within 500 miles of an ocean port.

4. The deep water route will let the lake fleet move freely between inland and coastal waters, and will give ocean vessels easy access to the lake ports.

5. It will extend to all the region between the Rocky Mountains and the Alleghenies the benefit of the cheapest transportation in the world.

6. The deepened waterway will eliminate transfers and all their costs and delays between the head of navigation and the sea board.

7. The waterpower will produce power that will pay the entire cost of the job.

WILL THE PROPOSED WATERWAY BE ANOTHER DISAPPOINTMENT?

There is not space in this brief article to take up a systematic discussion of the various points listed. To weigh all the facts and to discover wherein they substantiate or refute the reasons given above would be too lengthy. Therefore, only the more salient factors regarding the practicability of the deep waterway, and certain conclusions, can be given here.

The effect of the waterway on the development of the West, the reduction of distance, and the effect of the waterway on the relief of railway congestion are entirely dependent on the answer to one all important question: Can and will the St. Lawrence Deep Waterway actually be used by ocean vessels in foreign and coastwise trade, and will it be used enough to justify the cost?

The following slogan has been formulated by those interested in the deep waterway: "Make every lake port an ocean port." This is a catch phrase to arouse the interest of the lake ports. Experience in America, in Great Britain, and in all maritime countries shows that the carrying out of such a scheme is impracticable. Of our many good Atlantic ports, New York has more foreign commerce than all the rest of the ports put together. In England, two ports, London and Liverpool, each carries on more foreign trade than all the others combined. The tendency the world over is to concentrate the foreign trade of each country at a few ports. By such concentration, far

better service, cheaper rates, more frequent sailings, and greater availibility of cargo are obtained. Therefore, at best, only one or two of the lake ports could expect to attract ocean vessels to an extent that would give to shippers the prompt and reliable steamship service without which no port is attractive to shippers. Every important port on the lakes would, however, clamor for government appropriations for the enlarging of its particular harbor. At present none of the harbors is deep enough to admit the large ocean vessels which will be able to use the improved St. Lawrence. Twenty-seven harbors on the lakes are improved for vessels drawing from 19 to 22 feet at ordinary stages. About forty-five harbors of less importance are improved to a depth between 14 and 19 feet. Practically all the harbors admit boats drawing 14 feet. The federal government alone has spent on the seven largest lake ports from two and one-half millions to over eight millions of dollars each. Added to this are sums spent by state, municipality, or corporations ranging from $200,000 to over $8,000,000 each. Buffalo, for example, has expended up to date $15,000,000 on the improvement of its harbor.

It is needless to say that most of the smaller lake cities can never attract enough ocean traffic to justify the perfecting of their ports and terminal facilities.

LAKE AND OCEAN VESSELS COMPARED

It is hardly necessary here to discuss at length the relative merits of lake and ocean vessels. The lake carriers could not be used on the ocean for they are unseaworthy. Government statistics show that the initial cost of the ocean freighter is from two and one-half to five and one-half times as much as the lake bulk freighter of the same cargo capacity; the operating expenses per annum are from three to five and one-half times as high. The lower cost and greater efficiency of the lake bulk freighter over the ocean freighter is due to its lighter construction, smaller crew, and special construction for rapid loading and unloading of ore, coal, and grain. In fact, a recent bulletin of the Great Lakes-St. Lawrence Tidewater Association admits that there is no room for competition in bulk traffic between the two types of vessels. It says, "There is no other vessel in existence that can compete with the bulk carrier on the lakes; any boat coming from the ocean would starve in their field."

Iron ore from the Lake Superior mines, which comprises 62 per cent of the present total lake traffic, does not enter into foreign trade

at all, but is unloaded at various lower lake ports. Coal, which forms 33 per cent of the lake traffic, is a west-moving product. Only grain remains as a possible export commodity which might use in a large way the St. Lawrence deep waterway. But ocean carriers can not compete with the specialized lake carriers on the lakes in carrying grain. Therefore, the deep waterway would benefit grain transportation only in the following way: lake boats up to 25 feet draft could reach Montreal, where transhipment to ocean vessels would take place. At present lake boats up to 14 feet draft do this.

Official statistics show that the initial cost of an ocean package carrier is from one and one-half to three and one-half times as high as that of a lake package-freight vessel; the cost of operation is 2.8 to 4.5 times as great. The difference here is not so great as in the case of the bulk carrier, but there is a large enough difference to give the lake boat a distinct advantage over the ocean vessel.

In spite of the present lower rates by the lake carriers on package freight, the facts show that practically all of this type of freight is carried by the railroads.

The published rates show that with transfer charges included in all cases, the all-rail rate per ton on package freight from Chicago to New York is from 110 per cent to 120 per cent of the present lake and rail rate and about 160 per cent of the Lake-and-Erie Canal rate. These lower water rates, however, have not been effective in increasing the water-borne package freight, or even in enabling it to hold its own. This type of freight handled at Buffalo has decreased from one and a quarter million tons in 1902 to one-half million tons in 1919, or 60 per cent. "This decrease is the more remarkable as, during this time, the country was prosperous, the bulk freight traffic was increasing rapidly, and during part of the time there was serious railroad congestion which might have been relieved by greater shipments by water."

The statistics show that: (1) Altho water rates from Chicago to New York are now cheaper than rail rates, yet (2) that cheapness does not attract any considerable amount of business; (3) There must be reasons more influential than low rates which determine the routes of package freight.

The explanation of the decline of inland waterways is the superior service and greater dependability of railroads and the ability of the railroads to run their tracks right up to wholesale and manufacturing establishments. The cost of haul between a manufacturing plant and a dock may be more than the difference between the rail and water

rate. "These and other inherent difficulties make it doubtful whether a very great proportion of miscellaneous freight moving from Atlantic seaboard to the northwestern states would be carried by ship canal."

"Experience proves that waterways in general cannot attract any considerable amount of high-grade freight when in competition with railways. The natural traffic of waterways is in the low grade commodities."

It has been suggested by some who realize the impracticability of economically using lake boats on the ocean or ocean boats on the lakes that a compromise boat be constructed which would embody the advantages necessary for both lake and ocean sailing. The following statement is made by a government engineer: "While it is possible from an engineering standpoint to build a vessel which shall combine to a limited extent the particular necessit es and advantages of both lake and ocean vessels, such a vessel would not be a good business enterprise. However carefully a vessel may be designed for service on both lakes and ocean, she must necessarily be a compromise between two widely differing types, and inferior to each on its own water. She can neither carry cargoes on the lakes as cheaply as the lake ships nor on the ocean as cheaply as the ocean ships; and even supposing that the advantage of the avoidance of transfer will more than make up for these disadvantages and the time necessarily lost in any canal that can be constructed, she would have this advantage for but little more than half a year, and the remainder of the year she must run on salt water at a loss as compared with other ships."

This leads to the fact that the St. Lawrence waterway is closed for nearly five months of the year. The Welland Canal limits the open season to about 238 days, or 7.4 months. It is doubtful whether an ocean line ship can afford to carry on lake to ocean traffic seven and one-half months of the year, then break off and establish new routes, new schedules, and generally rearrange plans for four and one-half months, and later again resume the lake-ocean route. In the case of the tramp ship as a lake-ocean carrier, the limited season would probably have a less serious effect.

The heavy fogs and ice are a source of danger to vessels sailing from Montreal. A comparison of ocean insurance rates and Great Lakes-St. Lawrence rates shows that these dangers are a real factor. Shipments from Boston and New York to Europe have a rate of about 12½ cents to 15 cents per hundred, which covers for a year. For shipments from Montreal the rate ranges from 22½ cents in the summer months to 50 cents or higher in the fall months. Rates on the

Great Lakes, including the St. Lawrence River, to Montreal vary on different commodities, and, perhaps, in comparison with the above rates, one might figure them in the summer at 25 cents increasing to at least 50 cents in the fall. *The geographical location of this waterway so far north is a condition seriously handicapping its usefulness.* This, it seems, has not been sufficiently realized. It must also be taken into account that the outlet and inlet of this waterway is not in our own country or under our sovereignty, but is in a foreign country.

WATER POWER DEVELOPMENT

The question of water power development falls within the field of engineering rather than in the field of geography; therefore, the discussion of water power as connected with the Great Lakes-St. Lawrence Waterway must be brief.

It is quite customary for persons interested in some new project to attach to it, as an added inducement, some allied project. This is the case with the proposed St. Lawrence Waterway. The water-power project might be called a rider to the waterway, and too much hope should not be put in the waterpower. It is granted that there seems to be a future market in New York and Ontario for a certain amount of hydroelectric power, provided the price is low. The competition with steam generated power makes a low price necessary.

There has been a tendency to exaggerate the quantities of water power capable of development in the St. Lawrence River. The ice menace in the case of the St. Lawrence is of fundamental importance. A report of the British Government gives the low-water power of the international section of the St. Lawrence River as 800,000 horsepower, of which Canada and the United States is each entitled to 400,000 horsepower. In a Great Lakes-St. Lawrence Tidewater Association publication, the amount of power available is given as 1,764,000 horse-power on the international portion of the river. This estimate is over twice that of the British Government report. The Tidewater Association anticipates a transmission of this power for a radius of 350 miles. A special government committee on water power development states that hydroelectric power is "now available in convenient form within a radius in some instances of up to 200 miles." It is not a physical impossibility to transmit electric power greater distances, but the competition of local steam generators limits the practical distance of transmission.

These figures of the British and United States governments show that the estimates published by the advocates of the waterway are

too high as to the distance of practical transmission, and also for the total amount of power available in the international section of the St. Lawrence.

The amount of waterpower available for the United States on the international section is 400,000 horsepower, and according to the value per horsepower given by the advocates of the project would yield $6,000,000 annually. This represents, at the present interest rate of five and one-half per cent on government bonds, an investment of $110,000,000. The estimate for the United States' share in the waterway is $130,000,000. Thus the annual income from the hydro-electric plants, provided all the power were sold, would not be sufficient to pay even the interest on the original investment, much less to pay for the maintenance of the waterway or for the original cost. Moreover, it would be many years before there grew up a demand for all the power. Not until the present year has even the developed power of Niagara been harnessed to its full capacity as stipulated in the treaty between the United States and Canada.

Thus the waterpower argument which at first seems a strong argument for the waterway is not convincing, and for several reasons: (1) The waterpower development is a rider to the main project. (2) With an immediate market for the total amount of waterpower available the annual income would not pay even the interest on the cost of the waterpower. (3) There is not an immediate market for the total available waterpower, and will not be for a long time to come.

CONCLUSION

The arguments put forth in favor of the Great Lakes-St. Lawrence Deep Waterway are dependent upon one fundamental question. This question is, Will the waterway actually be used by ocean ships enough to justify its cost? The advocates assume that as soon as the waterway is opened ocean vessels will proceed on their way into the interior. Then they promise that the waterway will develop the Middle West, relieve railway congestion, cheapen transportation, and make every lake port an ocean port. But if ocean vessels find it unprofitable to use the Great Lakes route, then these promises can not be fulfilled.

Of course, the definite statement can not be made that ocean vessels will or will not use the waterway until a trial has been made. The facts at hand, however, indicate that ocean ships, costing several times as much to build and operate as lake vessels, will not be able to profit by the long, slow voyage up the St. Lawrence and thru the

Lakes. The bulk freight for export can not profitably be carried from lake ports to foreign ports in ocean vessels. Even if the lakes were opened up to larger ocean vessels the export grain would probably be transhipped from lake to ocean vessels at Montreal.

As concerns package freight, it is very doubtful whether there is a regular and sufficient amount of import and export package freight that could be diverted from the railroads to the waterway. Even now, when the lake rates are lower than rail rates in the same territory, the amount of package freight carried on the lakes is relatively insignificant.

The enlarged waterway would have its effect on the grain traffic of the United States and Canada only to the extent of allowing the lake vessels during seven and one-half months of the year to extend their voyage to Montreal where transhipment to ocean vessels would take place. Much of the package freight using the water route also would be carried to Montreal and there transhipped. It is doubtful whether the governments of Canada and the United States can under present conditions of lake and ocean shipping afford to spend hundreds of millions of dollars to enable a small number of ocean vessels to call at lake ports, to enable the lake bulk-freight vessels to extend their trip to Montreal, and to make possible the carrying of a limited amount of package freight to Montreal in lake vessels there to be transferred to ocean vessels. There are likely to be very few ocean vessels using lake ports.

The advocates state, however, that the governments will not have to pay for the building of the waterway. It will be entirely paid for out of the receipts from the water power developed. The available facts show, however, that this is far too optimistic.

It is not at all clear that the combined benefits derived from the limited use of the deep waterway as a waterway and as a source of water power would be commensurate with the necessarily large expenditure, and these projects nearly always cost much more than the highest preliminary estimates. Nothing in our waterway history justifies full faith in the success of this proposed, very expensive project.

THE TEACHING OF DIRECTIONS IN SPACE AND ON MAPS

DOUGLAS C. RIDGLEY
Illinois State Normal University, Normal, Illinois

DIRECTIONS IN SPACE

The necessity for knowing directions in space. Every person finds it necessary to know the directions north, east, south, and west, and also the four intermediate directions. Few persons have been so well trained in their early years in determining accurately the points of the compass that, if they have traveled many miles from the home locality, they have not been "turned around" in their sense of the directions in space.

"How many have never been seriously turned around in directions?" This question has been asked of many groups of teachers, aggregating more than a thousand persons, and not more than five per cent indicated that they had had no serious trouble with directions. Probably not more than one per cent had mastered directions in space so that they had not been inconvenienced in any way.

Examples of wrong teaching. In a geography class in a normal school, a student with teaching experience asked how he might correct a wrong sense of direction with reference to distant places. He explained that in thinking of New York City, it was necessary for him to visualize the map of the United States as he faced southward, then on the map he saw that New York City was to the right, which, of course, was westward. He then reasoned to himself that New York City was in the opposite direction, that is, eastward. His early geography training had been such as to lead him to believe that geography was the study of a map placed on the south wall of the schoolroom. In later years he learned the error of this teaching, but was unable to overcome, in his own experience, the false ideas associated with his earliest study of geography. His brother, two years younger, who attended school in the same schoolroom, did not have similar difficulty. His testimony showed that at some time during the two years after the older brother had begun the study of geography, the seats of this schoolroom had been turned to face northward and the maps were on the north wall. The impressions of the younger brother with reference to map directions were largely confined to the map also, but in later years, when he made for himself the interpretation of the map with reference to space, east and west were in the same direction as on the map.

It is not possible to have the wall maps on the north wall of all schoolrooms, but if the direction on the map is related to direction in space from the very beginning, by requiring pupils to point in the right directions in space, there will be no difficulty in making the proper transfer of map direction to space direction.

A high school girl indicated her inconvenience in thinking directions by stating that she was always facing the east. Actual directions had no appeal and no meaning to her. Wherever she found herself, she was facing the east, west was behind her, south to her right and north to her left. When she was but two years of age, her friends had played with her by having her stand daily for a few minutes with her back to the piano and point east, west, north, south. In this position she was facing the east. These early impressions of babyhood had stayed with her, and she was unable to rid herself of the false "seeming" concerning directions thus deeply impressed.

An example of correct teaching of direction. A normal school student stated that she had not been turned around in direction. She had traveled to various cities in the state, some of which were irregularly laid out as to directions, yet she had had no sense of inconvenience in her thought of directions. Of all the persons questioned concerning their sense of directions, her testimony was the most convincing with reference to the method of correct teaching. Her first experience in learning directions occurred in the first grade, at the age of six. Her teacher had taught directions to the first grade pupils as if the learning of them was a game running thruout the year. At the opening of school for the day the teacher asked the question: "Where is the sun?" Pupils were taught to point towards the sun by noticing the sky and the shadows. At noon they were again asked: "Where is the sun?" The same question was repeated in the afternoon and at the close of school.

This procedure was not a part of any formal school subject, but only a game enjoyed by both teacher and pupils. After a few days the teacher instructed the pupils to look for the sun as early in the morning as they could see it. At the opening of school she asked the question: "Where did you see the sun early this morning?" As they pointed in the right direction, she said, "That is east." At recess time she asked, "Now, where is the sun?" and then said, "That is southeast." In the same way she gave them the direction south, southwest, and west. No reference was made to any method of determining direction except by finding an answer to the question: "Where is the sun?"

When this part of the game was well understood, the next step was a study of shadows including the shadows of the pupils, the schoolhouse, trees, fences, poles, and other conspicuous objects. At noon the game included the following: Where is the sun? That is south. Where is the shadow of the tree? In what direction does it fall? North. When the noon shadow was well understood, a study was made of the early morning shadow and the late evening shadow. At the morning recess, the direction of the sun was observed, then the direction of the shadow. This introduced the term northwest as the opposite of southeast. In the same way an observation at the afternoon recess introduced the term northeast as the opposite of southwest. It is to be noted that directions were determined only with reference to the position of the sun and the shadows; that the direction of a shadow was always introduced by making it the opposite of the direction of the sun. These early ideas laid a firm foundation for future study of the trend of earth features as expressed by such terms as north-south, northeast-southwest.

The next step consisted in observing first the direction of the shadow, and from this alone determining the direction to the sun, thus reversing the earlier process of determining first the direction of the sun, then the direction of the shadow. In all observation work of this sort, children should be taught that they are not to look directly at the bright sun, but just to notice in what part of the sky it is.

Later, these first grade pupils were taken into the woods for a lesson in nature study. When in deep shadow, they heard the oft-repeated question: "Now, children, where is the sun?" and the game took on new interest as they searched for the sun thru the foliage above and for the shadow of a particular tree among the numerous shadows of the forest.

This normal school student did not recall other specific teaching of directions than that received from this first grade teacher. So well had she learned the lesson of directions in space based on sun and shadow that determining direction for herself by any other means except by the stars at night, learned in later years, never occurred to her. She was asked how she determined directions in a new place if she arrived there when the sky was so cloudy that the sun was not visible by day nor the stars at night. She replied that she either inquired the direction or waited until the sun did shine. She was not inconvenienced at all if she could not determine the directions at once when in new surroundings, but waited until the opportunity came to learn with unerring accuracy the directions in space.

An example of a keen natural sense of direction. A captain who served in the American Army during the World War was stationed in a southern army camp. A group of officers wished to ride on horseback across the rugged country and return by a different route making a circuit, as indicated on a map of the region, of about thirty miles. The roads were laid out irregularly and were frequently winding or crooked. The route was entirely new to the captain as well as to his brother officers, and the sky was cloudy. He was appointed as guide. Without compass or map for consultation he led the way, turning in many different directions and at many different angles. Under the protest of some of his companions that they were going far out of their course, he kept steadily on the road of his choice, and at the appointed time led the party into camp. Without aid of map, or compass, or sun, he had no doubt at any time during the journey about the precise direction to camp, and he was able to select with certainty the road which would keep him in the general direction of his goal. His skill in knowing directions seemed to be based upon an unusual aptitude, not fully understood by himself, for knowing directions in space and by constant use of his keen sense of direction from boyhood.

How shall direction in space be taught? The correct teaching of direction in space seems to depend on the proper use, in the early experience of pupils, of directions in space as determined by sun and shadows and stars rather than by teaching direction in the schoolroom, along street or roadway, or on the ground. If direction in space is firmly grasped with reference to the actual direction of heavenly bodies, then this direction can be readily related to direction on the earth's surface whether in America, or Europe, on the ocean, on the desert, or in the trackless forest.

Confusion in direction in space and the consequent inconvenience of being "turned around" seem to lie in the association of the first ideas of direction with some particular room, or farm, or roadway, or street at home. When the person travels elsewhere he has the feeling that direction "on the ground" must seem to him just as direction "on the ground" did at home. If, however, correct ideas of direction in space with reference to heavenly bodies are thoroly mastered, this association is correct at all times and for all places. It therefore behooves the teacher of home geography to lay a sure foundation for the correct interpretation of directions in space. So important is this phase of geography instruction that the teacher should make

special effort to devise methods of presenting it so that the study will be fascinating to pupils day after day thruout the year until it becomes thoroly grounded in their thinking.

Directions on Maps

Early steps in map study. It is important that pupils be taught at the very outset of map-making to interpret directions on maps in terms of directions in space. This work may be begun with the construction of the first plans and maps of schoolroom, school grounds, and school locality. Let us suppose that we have before us a sketch map of the school grounds drawn free hand by careful observation under the direction of the teacher while out-of-doors. The map may be drawn to show the position of the school grounds without any special emphasis on directions. With the map lying in the same position as the school grounds the words north, south, east, west may be written on the appropriate margins of the map.

With the map lying on the ground out-of-doors, or on the floor of the schoolroom, in the right position, the following questions may be asked and answered. Show us north on the map. Point north. Show us south on the map. Point south. Show us east on the map. Point east. Show us west on the map. Point west. Here the directions on the map are the same as the directions on the school ground and in space. Now hang the map on the north wall with north edge of the map at the top. Ask and answer the same questions as before. While north and south on the map are no longer in the same position as north and south in space, east and west are still in the same position on the map as in space.

Later, place the map on the east wall. Ask and answer the same questions. Use the map in the same way on the south wall and on the west wall. In every case require the pupil to pass the hand across the map in the direction indicated, then immediately to point in space in the right direction.

When wall maps are introduced, practice should be given in the same way in order to compel the pupils to interpret map directions into correct space directions whether the map is lying on the floor in any direction whatsoever, or hanging on any of the four walls of the schoolroom. Similar drill should be given in the interpretation of direction of maps in the textbook. In this early map reading, pupils should turn in their seats in different directions and translate the map directions of their textbook into correct directions in space.

A noted geographer and cartographer testifies that in his mature years he finds it necessary to translate map directions into actual space relations by a change of 180 degrees. This he attributes wholly to the fact that in his first years of the fascinating study of maps he sat at a schoolroom desk facing southward, and the exact relationships between directions on the map and in space were not developed by the teacher in these early studies of maps. Careful teaching in the very beginnings of map reading will avoid such difficulties which seem to persist in later life in spite of diligent efforts to erase from mind these erroneous early impressions.

A map drill with map on the south wall. The writer once stepped into a fourth grade geography class who were studying the wall map of the United States. The map was on the south wall of the schoolroom. He was requested to test the pupils in any way desired. A few minutes were spent in determining the ability of these pupils to translate map directions into space directions. The exercise was carried on as follows: Find Illinois, Maine. In what direction is Maine from Illinois? Northeast. Point northeast. In the same way, with Illinois as a center, we used Pennsylvania, Florida, Mississippi, Arizona, California, Washington, and Wisconsin. Not a mistake was made, nor did the pupil at the map hesitate for an instant in pointing in the right direction. In this respect the teacher had done her full duty to the pupils.

A peculiar reversal of map directions. One of the most persistent mistakes in direction on maps which has come to the attention of the writer is the tendency on the part of a large proportion of students to interpret incorrectly east and west in the Old World, and especially in Europe. The British Isles are frequently spoken of as being in the eastern part of Europe and Russia in the western part, the Iberian peninsula in southeastern Europe, the Balkan peninsula in southwestern Europe, and the Scandinavian countries in northeastern Europe. No explanation of this common error has been found except the tendency to interpret the direction toward the Atlantic Ocean as east and the direction away from the Atlantic Ocean as west. Careful attention and persistent effort on the part of the student soon removes this difficulty. One student, when this subject was under discussion, stated that to him the Atlantic Ocean seemed west and the Pacific Ocean seemed east. This was readily explained by the fact that he had been born in England and had had his elementary school training there. He stated that he had been in America about one year before

he was comfortably certain that by going east he would reach the Atlantic Ocean and by going west he would arrive at the Pacific Ocean. Brief, rapid, and pointed occasional map drills will avoid these difficulties of thinking.

Interpretation of meridians and parallels. In the early map work it is sufficient to teach pupils that the top of the map is north, the bottom south, the right-hand east, the left-hand west. When detailed work of the advanced textbook is taken up, it is necessary to teach that on all maps, meridians indicate north-south directions and parallels indicate east-west directions. A lesson is profitably spent in the study of different kinds of maps in the textbook and on wall maps to show the various ways of drawing meridians and parallels on maps of different projections. Thruout the entire study of geography, the fact must be emphasized that north-south is represented accurately by the meridians and east-west by parallels regardless of their straightness, curvature, or direction on the page.

It is probable that no other topics in geography make such an indelible impression thruout life on the minds of pupils as the first impressions given concerning directions in space and directions on maps. The geography teacher who devises interesting methods of presenting these difficult topics in the right way and frequently enough to secure accurate and permanent knowledge and appreciation of them has performed an exceedingly valuable service to his pupils.

THE KIND OF GEOGRAPHY THE WORKING WORLD NEEDS*

E. E. HOLMES
State Normal School, Lewiston, Idaho

The importance of geographic knowledge in the development of national life is well recognized. The broad field of geography and its significance in international affairs offers an unlimited opportunity for its advancement. Pupils today are studying maps and histories about places they see mentioned in the newspapers and hear discussed in their homes, more than ever before. Many brothers and fathers of school children have returned from across the ocean with their wonderful tales of experiences, places and the life in other lands all full of human interest. A new human touch is placed upon their study of France, Belgium and various European countries as they read and

*Given before the Geography Section of the Inland Empire Teachers' Association, Spokane, Washington, April, 1920.

hear the stories of the sacrifice of these peoples in the defense of their homes. The war has turned the world abruptly to new paths and unknown ways. Wide-awake teachers recognize most keenly that the war has made the world a new place in which to live. We are thinking today in terms of the international rather than national, and to be the best citizens we must have an acquaintance not only with our own country but also with the family of nations outside our own. In the working out of the great problems of reorganization and reconstruction, both here in the United States and abroad, further knowledge of other nations of the world is being sought by every wide-awake American. Now is the time to take advantage of this awakened interest to advance the teaching of geography. Never before has such knowledge been so necessary to intelligent citizenship. The future for our country in international trade and relations looms very large; to understand the possibilities before us wide geographic knowledge is necessary. Leading men in commerce, finance and business, with a broad outlook were already alive to the situation some time ago.

In the *Nation* for October 19, 1918, we find an article on "Foreign Investments after the War," by William S. Kies, vice-president of a large corporation. "Whether we desire it or not," says the author, "the United States hereafter must play a major part in international affairs. We are fast becoming the greatest creditor nation in the world." Mr. Kies argues that while some investments in foreign countries were made by citizens of the United States before the war, the securities resulting from these ventures had no general market in this country. Among other reasons he finds cause in "ignorance of commercial geography, lack of knowledge of other countries, failure to understand and appreciate the customs, the characteristics, and the ideals of other peoples; a certain narrowness of vision which confined our view to our own boundary lines; in a word, to our inability as a nation to think internationally." That is the keynote and precisely our geographic failure—"our inability as a nation to think internationally."

GEOGRAPHY MUST BE REAL

What geography needs is that its study be directed, that it be taught with vision, and that interest in it be stimulated thruout the length and breadth of the land. If the last can be accomplished, if the business man, the professional man, and the mechanic can all be made to feel that broad and sure geographic training is vital to sound

education, the first two needs will be filled as a consequence. But who are the business men, the professional men, and the mechanics of "tomorrow"? Are they not the pupils in our schools today?

The present movement in geography is the logical third step in any school subject; that is, the reorganization of the subject from the standpoint of the child and its adaptation to his interests and needs. The more fully teachers can make geographical knowledge a means of explaining things in which the children have a natural interest, the more eagerly will children seize that information. The study of a banana carries us in a fruit steamer southward into the tropics, to a plantation in Jamaica, Costa Rica, to lands where snow never falls, and even a frost is unknown, where the trade winds blow; a cube of sugar leads to a plantation of Louisiana or Cuba, or to the sugar beet fields of Colorado, Idaho, or Montana. Thus geography takes on an aspect of usefulness in the child's world. The kind of geographical knowledge we need, then, is that which will contribute to the everyday needs in the life of our boys and girls who are the men and women of "tomorrow"; the kind of a geography which will assist them in successfully combating their social and physical environment.

GEOGRAPHY MUST TEACH THE BROTHERHOOD OF MAN

In our great problem of Americanization we need the kind of geographical knowledge of such countries as, Italy, Poland or Greece which will be "an avenue of wise, sympathetic and effective approach to the sons of these lands" as they land upon our shores. That to know European countries will be to have "seen a new light in the face of a Norwegian, a Swede or an Italian when one has talked with him familiarly, of the scenery, the cities and the modes of life in his native land. Sympathy, knowledge and purpose are required in making citizens out of our aliens." It is in geography, while our boys and girls are studying the folk of other lands, that the opportunity presents itself to emphasize the brotherhood of man and the contribution made to civilization by the various nations and races in one line of endeavor or another and thus to establish the fact that it is not entirely position on any certain continent, nor utterance of any particular language, important as these may be, that determines the greatness or superiority of individual, nation, or race.

It is here that the noblest work of the geography teacher is found. The importance of emphasizing certain basic geographical principles in the teaching of the subject is well recognized, but if the child leaves the class with a fund of geographic principles but with no greater

love for his brother, with no true conception of what superiority means, to occupy a political, commercial, or other public position, one great purpose of the course has been defeated.

GREATER EMPHASIS UPON HUMAN GEOGRAPHY NEEDED

We need in our schools a greater emphasis upon human geography, the aim of which is to contribute to an understanding of the changes which have resulted in the differences between the human groups inhabiting the earth. Human development has been conditioned at every step by the irregularities of the earth's surface; and it is the variety presented by the earth that we find reflected in the varieties of human culture. The study of geography in relation to man thus implies an investigation of the influence of environment, in contributing to the diversity of culture, customs and beliefs. Mr. Roderick Peattie defined the New Geography as "the study of a region's domination of a people—of the cultural diversities of peoples and the reasons which lie back of that diversity."[1] It is questionable whether the emphasis should be placed solely upon the region but the world must be studied as a whole. It is not the world as a mere aggregation of parts or elements that geography has to study. It is the organic unity of the world in which man "lives, moves and has his being" that geography has primarily to investigate. Geography then deals with the real world. It deals with the reasons why the material world—regarded as a whole and made up of related parts—has come to be what it is. It deals with the way in which this material world has influenced man, and in turn has been modified, altered and adapted by human action. Geography is thus essentially concerned with the manifold diversity of man and of his problems and opportunities. It may thus claim to contribute in a unique fashion to an education which aims at the appreciative interpretation of the modern world.

GEOGRAPHIC TRAINING FOR CITIZENSHIP NECESSARY

The spirit of the new geography, then, is to reach out to all types of men, and to give in terms they can understand, the truth about the most interesting subjects in the world—themselves and their neighbors. Again we need a type of geography which is characterized by a conscious attempt to meet the needs of the pupil as a member of society. We need such methods in geography as will train for citizenship. Mr. Peattie says in this regard, that "without training in the principles of the new geography, one is unable as a good citizen to

[1] *Educational Review*, Dec., 1919.

give an intelligent hearing to the problems of the day." Professor Albert Perry Brigham states that "Geography is to be a part of the training of statesmen," since "we can not have a school for statesmen" and since "all Americans may be statesmen in embryo, our only safety is to catch them while they are young. Statesmen will, in the long run, be made out of the material of our schools and their course will be shaped by public opinion." Teachers, ministers, and civic and social missionaries need a knowledge of the world in laying the basis for intelligent patriotism. It is reported that merchants in Alaska are very much embarrassed and handicapped at times when ordering supplies because commercial men in the States do not understand conditions in Alaska and think it isolated much of the year. The future merchant needs a geography which will give him such information as will avoid this and give him the true conditions—that there is transportation to the southern part of Alaska at all times of the year.

In the Bureau of Education Bulletin No. 35 (1918), "Cardinal Principles of Secondary Education," the goal of education is defined as, "Education in a Democracy, both within and without the school, should develop in each individual the knowledge, interests, ideals, habits and powers whereby he will find his place and use that place to shape both himself and society towards ever nobler ends."

During the last few decades the activities of the indiviual have been decidedly modified. As a citizen he must to a greater extent and in a more direct way cope with the problems of community life, state and national governments, and international relationships. As a worker he must adjust himself to a more complex economic order. As a relatively independent personality he has more leisure. Relative to civic education the report continues, "While all subjects should contribute to good citizenship, the social studies—geography, history, civics and economics—should have this as their dominant aim. Geography should show the interdependence of men while it shows their common dependence on nature." If we compare this with the definition of the goal of education the significance of geography stands out.

In conclusion, then, the geography that is real, human and which contributes to the training for citizenship occupies a necessary place in education, valuable as culture, valuable thru supplying knowledge of facts useful in everyday affairs, valuable and even necessary for the citizen in order that he may understand his duties.

If we could only realize that modern geography is more than a study of the map; that it is more than a memory drill of places and

unrelated facts; that it has for its field a multitude of relationships, especially the relationship of all life to physical environment; if we could only get filled with the spirit of the "New Geography" and realize its ability to contribute to the needs of everyday life, we would awaken to the situation, give strict attention to the subject matter we are teaching, and place the emphasis upon those principles of geography that may be vitilized in the lives of our boys and girls and that will prepare them for citizenship in the new era that is at hand.

GEOGRAPHICAL NEWS

STATE COUNCIL MEETING IN TEXAS

The first meeting of the Texas Council of Geography Teachers was held in Dallas, Thursday, Nov. 24, 1921. Up to this time the State Council had been content with a place on the program of the Geography Section of the State Teachers' Association. It is expected that the annual program will continue to be a part of the State Teachers' Association.

Three things were attempted in this first program: reports were made on assigned topics following investigation, and constructive measures were proposed; material was passed out to the teachers present, and a field trip was made.

The reports covered the following topics: the geography teachers of the state and the schools having geography supervision; geography courses now being given in high schools, in normal schools and colleges, and in universities; the work that the State Council has accomplished and the further work that it should undertake.

The material given to the teachers included a statement setting forth the aims of the Council, a folder advertising the *Journal of Geography*, a folder of helps for geography teachers, and a bulletin containing reports of the year's investigations. The members of the Council had previously received thru the courtesy of its publishers a copy of "Human Geography" by J. Russell Smith.

The field trip was in charge of Dr. E. M. Shuler of the Southern Methodist University, who took a party of twenty thru the Texas Hosiery Mills and thru the Dallas Cotton Mills.

The program provided for no outside speaker and embodied no spectacular feature, yet it brought together a representative group of geography teachers whose interest in the work was further shown by questions and discussions following the reports. The chairman feels that the Texas Council is at the beginning of important work that will lead to greater effectiveness in geography teaching.

Harriet Smith, *President*

GEOGRAPHIC NEWS BULLETIN

Teachers thruout the country will be pleased to hear that the *Geographic News Bulletin* will be available again. It was established by the National Geographic Society in the fall of 1919 because of the emergency demand among teachers for material which would keep them informed of boundaries and sovereignties, shifting too rapidly to be incorporated into textbooks, and give a better background to teach about many places and peoples suddenly emerging from obscurity to centers of world interest. Because of restrictions in the franking privilege thru the mails, the Bureau of Education, which mailed this material out under government frank for two years, was unable to extend that privilege this year.

The Society's officers have decided to issue the bulletins to teachers at a small fee which ill cover the cost of mailing and continue the gift of this material to public schools by

paying for its preparation and printing. The *Geographic News Bulletin* will be resumed February 1, and the cost of the thirty weekly issues, that is a subscription for one school year, will be twenty-five cents. This amount may be remitted in stamps, directly to the Society, Washington, D. C.

GEOGRAPHICAL PUBLICATIONS

Douglas C. Ridgley. **The Geography of Illinois.** xvii and 385 pages, 227 ills. including numerous colored maps. The University of Chicago Press, 1921. $2.65.

This is the first in a series of geographies of various states planned by Professor J. Paul Goode, of the Department of Geography, University of Chicago. Professor Ridgley is peculiarly fitted to prepare such a volume on Illinois, the state in which he has lived and taught so many years. The plan of treatment is by topics, not by regions: for example, the geology, soils, minerals, manufacturing, transportation, cities, government, etc. form the units of treatment. The counties, as such, are not discussed separately, but are referred to constantly by name. In many of the chapters, e.g., those on "The Coming of the White Man," and on "Transportation," the subject is treated historically, as it should be. In certain chapters, one gets the feeling that too much stress is placed upon statistical matters which are of only temporary usefulness. The more fully books of this type treat of things of permanent value the better. Statistics cannot be ignored; they are necessary, but they need to be employed to show lines of progress or decline rather than temporary conditions.

The reviewer feels that Professor Ridgley has brought together a fund of thoroly valuable information about Illinois, organized and treated in a more or less encyclopedic way. A geographer feels the lack of emphasis upon interpretation. Since this is the first volume in the series, the reviewer would raise the question, Will not the series be increased in value by making the treatment somewhat less encyclopedic and more interpretative; by taking up certain large features of the geography of a state and showing how the development of the state has been strongly influenced by these dominant geographical conditions? Professor Ridgley has done this in a degree; we wish he had done it even to a higher degree.

R. H. Whitbeck

University of Wisconsin

A. K. Lobeck. **Physiographic Diagram of the United States.** Wisconsin Geographical Press, 1635 Madison St., Madison, Wis. 1922. Single copies 35 cents, ten or more, 25 cents.

Professor Lobeck's map presents the physiographic features of the United States in a form that materially simplifies the teaching of this phase of geography. The map is accompanied by five pages (12x19) of text discussing each physiographic region, suggesting many human relations, and raising numerous questions or problems. Professor Lobeck has also prepared a set of answers to all exercise questions which is included, upon request, with orders of ten or more.

R. H. Whitbeck. **The Geography and Economic Development of Southeastern Wisconsin.** 252 pp., 93 photos, maps, and diagrams. Wisconsin Geological and Natural History Survey, Madison. 1921.

Donald Wilhelm. **The Story of Steel.** 63 pp., numerous photos. United States Steel Corporation, 71 Broadway, N. Y., 1921. Free.

The teacher will find this little volume very useful and interesting.

Leonard Brooks. **A Regional Geography of the World.** 560 pp., 133 maps, 17 diagrams. University of London Press, Ltd., London. 1921. 7s. 6p.

This book is the fourth of a series of "New Regional Geographies." The other volumes treat The Americas; Asia and Australasia; Africa and Europe, respectively. The series is intended to form a four year course in geography for secondary schools. It is unique in that no line is drawn between physical, economic, historical, or political geography, etc. All phases of geography are blended in regional studies.

The author divides the world into four major natural regions: Hot Lands with five sub-types; Warm Temperature Lands with four sub-types; Cool Temperate Lands with six sub-types; Cold Lands with three sub-types. Fifty pages are devoted to a discussion of these regions. The remainder of the book treats each continent partially on a regional and partially on a political basis. There is a large amount of valuable information crowded into the text and American teachers will find it an excellent reference book. Unfortunately, the "get-me-ready-to-pass-the-examination" character of most English texts limits their usefulness in American schools. The ideals of the two countries, as expressed by the textbooks, appear to be widely divergent.

George M. Wrong. **The United States and Canada.** 191 pp. The Abingdon Press, New York, 1921.

This little volume presents a series of six lectures given at Wesleyan University under the auspices of the George Slocum Bennett Foundation. The lectures are titled as follows: The Dominance of the English-speaking Peoples in America; The Creation of Two English-speaking States in America; the Growth of Federalism in North America; Likenesses and Contrasts in the Federal Systems of the United States and Canada; The Place of Canada in the British Commonwealth; The Future.

Rena L. Crosby. **The Geography of Bible Lands.** 242 pp., 8 maps, 72 photos. The Abingdon Press, New York. 1921.

Every geography teacher will welcome a text treating the geography of the Holy Land. Thruout the book the close relation of the geography of the country and biblical writing is shown. One regrets, however, that there is not more real geography in the book. In this respect it is rather disappointing. However, it will be found very interesting and useful.

C. E. Cooper. **Washington State Supplement.** 32 pp., 39 maps, photos and diagrams. Macmillan Co., 1921.

The Mount Everest Expedition. 1 map, 22 very fine photos. *Geog. Jour.* Oct., 1921.

Gertrude Emerson. **The Philippines Inside Out.** 2 maps, 7 photos. *Asia*, Nov., 1921.

David Barrows. **A Friendly Estimate of the Filipinos.** 6 photos. *Asia*, Nov., 1921. The entire November number of Asia is devoted to the Philippine Islands.

Floyd Parsons. **Coal, To-day and To-morrow.** *World's Work*, Sept., 1921.

Floyd Parsons. **The Romance of Steel.** *World's Work*, Oct., 1921.

Robert F. Griggs. **Our Greatest National Monument.** 1 map, 90 photos. *Nat. Geog. Mag.*, Sept., 1921.

H. Lawrence Groves. **Switzerland—A Commercial and Industrial Handbook.** Sp. Agent Ser. No. 210. 128 pp., 12 photos. Bureau of Foreign and Domestic Commerce, Washington, D. C., 1921.

P. L. Bell. **Colombia—A Commercial and Industrial Handbook.** Sp. Agent Ser. No. 206. 423 pp., 17 photos, 7 maps. Bureau of Foreign and Domestic Commerce, Washington, D. C.

W. L. Schurz. **Bolivia. A Commercial and Industrial Handbook.** Sp. Agent Ser. No. 208. 260 pp., 23 photos, 1 map. Bureau of Foreign and Domestic Commerce, Washington, D. C., 1921.

A. P. Coleman. **Northeastern part of Labrador and New Quebec.** 68 pp., 17 photos, 3 maps. Geological Survey of Canada, Ottawa.

Charles M. Dow. **Anthology and Bibliography of Niagara Falls.** 2 vols. 1423 pp., numerous photos and maps. New York State Library, Albany. 1921. $2.50.

The author has brought together in these two volumes a large amount of highly interesting and useful material covering Niagara in history, in poetry and fiction, in natural science, in its later industrial phase, and an account of the fight for its preservation. It should prove of value to any school library and to teachers.

W. S. Murray and others. **A Superpower System for the Region Between Boston and Washington.** Prof. Paper 123. 261 pp., 11 plates, 61 diagrams. U. S. Geol. Survey, Washington, D. C. 1921. Free.

Louise Connolly. **Tibet—The Country, Climate, People, Customs, Religion, Resources.** 37 pp., 27 photos and maps. The Newark Museum Association, Newark, N. J., 1921.

C. C. O'Hara. **The White River Badlands.** 181 pp., 96 plates, 75 figures, diagrams, and maps. South Dakota School of Mines, Rapid City. 1920.

Vilhjalmar Stefansson. **The Fruitful Arctic.** World's Work, Jan., 1922, p. 313.

This is the third of a series of articles dealing with the erroneous ideas that are prevalent concerning the Arctic region and contrasting these ideas with the real possibilities of the area. Teachers will find these articles eminently useful.

Diamond Jenness. **A Contribution to the Geography of Albania.** 1 map. *Geog. Rev.*, Oct., 1921.

Maynard O. Williams. **Through the Heart of Hindustan.** 29 photos. *Nat. Geog. Mag.*, Nov., 1921.

Louise A. Jessop. **A Pilgrimage to Amernath, Himalayan Shrine of the Hindu Faith.** 29 photos. *Nat. Geog. Mag.*, Nov., 1921.

W. F. Hume. **The Egyptian Wilderness.** 2 maps, 11 photos. *Geog. Jour.*, Oct., 1921.